

Christmas Tree Management for Missouri Conditions

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Advance Planning

To initiate a successful Christmas tree operation, serious consideration must be given to the following points before the first seedling is put into the ground:

1. How much time will I have to devote to all the cultural work necessary, much of which will be seasonally critical in nature?
2. Location of the farm. Is it close enough to a sizeable population center to consider choose-and-cut, or will it be necessary to transport trees to a retail outlet?
3. Potential markets. Is your area already saturated with other established growers marketing the same way you intend to do? Do these growers and/or retailers now have a surplus of trees every year? Are there a substantial number of growers not now selling trees that will come into production at the same time or before yours are ready?
4. Considering the amount of land available, available time, potential markets, potential labor source and access to machinery, how many trees should be planted each year? Think in terms of a 10 year rotation, approximately 1,000 trees per acre (depending on spacing).
5. Am I willing to avail myself of technology in producing a quality product?
6. Am I willing to wait 7 years from the time of planting before any income can be realized from my efforts, during which time there will be required a considerable investment in time and a moderate investment in expenses?

Lots of folks decide to embark into the Christmas tree business without making these decisions, and each year many of them drop out when they discover the reality of time and expense involved.

Plantation Layout

Soil types. Scotch pine will grow on a wide range of soils, although initial establishment will differ considerably. Deep, fertile soils such as creek bottoms will grow trees fine but also they produce a rank growth of weeds that tend to present problems. Rocky soils present problems in both planting and in the mowing operation that must be done later. Severely eroded hillsides with exposed clay pan will produce trees, but survival rate will be much less, requiring several years of filling in to get a complete stand. This produces a very uneven plantation, and will have an adverse effect on rotation. Soils that are wet a good portion of the time should be avoided, since the pines do not like wet feet.

The best soils to plant Christmas trees are those typically found in old field situations in Missouri. They tend to be middle-of-the-road in fertility, which is completely adequate for pine, and do not produce a rank growth of weeds.

Site Preparation. This will depend to some extent on the type of vegetation on the planting site. In many cases, all that is needed is mowing to facilitate the planting operation. Established sod grasses, such as fescue, can be adequately controlled with chemicals, therefore mowing is also sufficient for these areas. Woody plants should be cut flush with the ground and removed, and the stumps sprayed with a suitable herbicide to prevent resprouting, since hardwood sprouts will have a serious adverse effect on Christmas tree quality.

Some folks advocate complete breaking of the ground to produce a better medium for planting. This is fine, but there are some disadvantages. Sloping land will be subject to erosion before natural vegetation can be re-established. This could be minimized by plowing strips on the slope contour where rows are to be placed, but this practice produces a furrow and an elevated area unless an additional operation is used to level the plowed area. In areas of established sod (bluegrass or fescue), the sod is an asset to have between the rows at harvest time, providing a clean mat to drag trees.

Some species are more sensitive to herbicides. An example is white pine, which cannot be treated with Velpar. In sod fields to be planted to white pine, a good site preparation practice is to spray strips where the rows will be planted during October prior to the spring planting season with a herbicide such as Roundup, Amitrol, or Dowpon. It is conceivable that Velpar could be used, since it would be no longer active by spring.

Spacing. This is one of the greatest potential mistakes in a successful operation. Unlike forest plantations, rows in a Christmas tree plantation must be accurately laid out, and spaced to fit the machinery available for mowing. Small plantations (up to 5,000 trees) can be adequately tended with small mowers, either garden tractors or walk-behind mowers, and thus spacing can be closer and still allow access. Larger plantations, however, usually require larger machinery, such as a small farm tractor and 5' rotary mower. The important thing to remember is that trees will "close in" as they grow, thus adequate spacing soon after establishment may not be adequate when trees are nearing harvest size. For example, a 6' tall tree will be about 4' wide at the base, thus will occupy 2' on each side of the row. If the small farm tractor and 5' mower is to be used, rows must be a minimum of 9' apart. The mower should be matched to the tractor so that the tractor wheels do not extend past the width of the mower. With the use of herbicides (discussed later), mowing in one direction only is necessary, thus trees can be spaced closer within the row. For this operation, a 9' x 5' spacing is good, which requires 968 trees per acre.

There are numerous pieces of equipment available, and each grower's preference and economic situation will be different, as well as the amount of land available and the size operation planned. In cases where a grower must hold spacing to a minimum in order to produce the number of desired trees on the amount of land he owns, he must plan to invest in the type of equipment that will accommodate this situation.

Probably the most common spacing for beginners is 6' x 6', or 1,210 trees per acre. As different equipment is acquired, spacing can be changed in subsequent plantings.

Road system. A important part of initial planning is access roads, used for tending the crop and for harvesting of the final products. In small fields (2 or 3 acres), a road at least 12' wide around

the perimeter is adequate. This is a good use of the land, since small fields are commonly partially surrounded by forest trees that cast a shade into the field. Scotch pine will not develop well in even partial shade.

Larger fields should be provided with a road system at least every 12 to 15 rows. If these roads are to be traveled by tractors or trucks during wet seasons (common in late fall at harvest time), well-established heavy sod, such as fescue, will be required. For roads in a choose-and-cut plantation that will have heavy travel by automobiles, a gravel surface would be much more desirable.

Vandalism considerations. Believe it or not, people steal Christmas trees. Hardly any remote plantation escapes some degree of pilferage, but some advance planning can lessen the degree. Particularly vulnerable are remote plantations operated by a non-resident, or fields located along roads and out of sight of the nearest occupied house. A thick hedge of multiflora rose along the road is a deterrent, but this plant spreads rapidly by bird-carried seeds, and because of adverse publicity is no longer recommended. Closely planted autumn olive will help, but would not stop a determined thief. The same could be said for high, barbed-wire fences.

There may be no sure-fire method. If plantations must be planted in areas of high potential theft, cultivating the cooperation of a close neighbor is about as effective as one could reasonably be.

Storage of equipment in remote areas is also an easy mark for vandalism and this can be even more costly than losing a few trees. In such areas, buildings cannot be locked well enough to prevent loss. Each grower must assess his own circumstances for a workable solution. In some cases, it might mean taking equipment home after each use.

Species Selection

Choices Available. Because of our climate, Missouri growers are confined to pine species. Spruces and firs will not produce Christmas trees economically here; survival rate is much too low, growth rate is nearly half that of pine (as much as 15 years required to produce saleable sized trees), and mortality after initial survival is often severe in years of serious droughts and high temperatures.

Each new grower should consider about 90% of his trees to be some variety of Scotch pine. A native of Europe, Scotch pine (*Pinus sylvestris*) is found in nearly every European country, and at a wide range of elevations. Origin of seed source results in considerable variation in trees, including color, growth rate, branch angle, needle length, age of cone bearing and resistance to various needle diseases. It is difficult to recommend a “best” strain, since no one strain has either all the best or worst qualities, and consumer preference is at least as varied as the trees. The best recommendation is to have several strains planted rather than the whole plantation alike. This not only adds variety for consumer choice, but spreads the risk of horrendous disease outbreaks.

In general, Northern European varieties are more resistant to needle diseases, have longer needles, more rapid growth, set cones at an earlier age (this is either an advantage or disadvantage), but do not hold color well into the winter months. Southern European varieties

hold color very well, are moderate to slow growers, short needled and very susceptible to brown-spot needle blight and *Lophodermium* needle cast. Mid-continental varieties fall somewhere in between, but not necessarily having the best qualities of the two extremes.

In addition, many private commercial nurseries in this country have developed seed orchards from some selected individual trees that have performed well, and normally sell these with some of their own names attached (examples: Hensler Orchard, Pike Lake Strain, Pennsylvania Strain, Vans 33, Herbst Non-Yellowing, etc.). Often the European origin is not known, or at least not divulged.

Additional variety can be offered by adding a few other species, to make up not more than 10% of the total plantation. An excellent second choice is eastern white pine (*P. strobus*). They are slightly more difficult to establish, require soils no less fertile than average, greater care in the use of herbicides, but shear well, have good color and a finer texture than other pines. They are not susceptible to brown-spot, but will occasionally have some bagworms and are sensitive to air pollution. From a consumer angle, the branches of white pine are flexible, therefore these trees will not support heavy ornaments.

Austrian pine (*P. nigra*) and red pine (*P. resinosa*) are both used to a small degree in the Midwest. They are similar in color (deep green), branch size (stout) and needle length (3"-5"). Both species are weak bud-setters, therefore must be sheared earlier than Scotch (about the first week in June) and even then produce a rather coarse tree. Here again, though, some consumers prefer them.

Virginia pine (*P. virginiana*) has been planted in Missouri for years for wildlife purposes, but commonly they tend to be crooked and generally poor quality for Christmas trees. Development of a genetically improved strain in the South during the last few years, however, has changed the picture. A few growers in Missouri have obtained a few seedlings, and several trees have already been marketed. They are an indeterminate growth pine, and with two shearings required each year, it appears they will make acceptable trees in as little as five years. Seed supply is a determining factor, and although they are being planted quite extensively in the South, obtaining even a few seedlings has been a problem.

Many growers try to plant a few jack pines (*P. banksiana*), but these make very poor trees. Needle retention on older wood is not good, which produces a rather sparsely-filled tree. They yellow badly, even when sprayed with a colorant, and although they reach saleable size similar to Virginia, jack pine is not recommended.

Where to buy. Most growers in Missouri start their plantations from stock obtained from commercial sources. Private nurseries may produce up to eight or more European varieties of Scotch pine, plus several selections from their own seed orchards. They grade their seedlings into several size groups, priced accordingly. Only the most vigorous size (commonly 6"-12") should be ordered. Many of the commercial nurseries have sandy loam soils, which encourages a fibrous root system, and thus the seedlings are better balanced (root/top ratio) when they are received and planted.

There is a feeling among some new growers that more costly items are better. Some commercial nurseries offer 2-1 transplants at premium prices, often \$200 or more per 1,000. These are commonly the same size tops (6"-12") as 2-0 seedlings, but supposedly have a better root system. Such stock is normally the smaller 2-0 seedlings that were graded during the previous year's selling season, and simply put into transplant beds for another year. The better root system could conceivably increase survival, but whether the plants will regain vigor to the point of offsetting the much higher cost has not been firmly demonstrated. Well-graded 2-0 seedlings have performed well, and are the recommended route.

Planting

Much has been written about planting tree seedlings, but we're still learning from past mistakes. The importance of row spacing has been mentioned, but perhaps needs re-emphasizing, since a mistake or careless work here will present problems during the whole rotation.

Planting is generally done by either hand, using various earth tools, or by mechanical means, employing a tractor-drawn implement that is capable of planting several thousand seedlings in a normal working day.

Hand planting. By far the best tool to use is the KBC planting bar. It has a blade wide enough and long enough to make a hole that will accommodate root systems of the size seedlings normally planted for Christmas trees. Other tools produce a hole either too narrow or of insufficient depth to allow proper spreading of the root system.

Of utmost importance is insuring that seedling roots are properly spread, are fully extended into the hole without being doubled back (J-shaped), and that the hole is adequately closed from the bottom first to avoid air pockets. Seedlings in Christmas tree plantations should be standing straight, rather than at an angle as is very often done, and generally caused by the final closing of the top of the hole by the heel of a No. 10 boot. Seedlings planted in such a manner will grow straight from the point where new growth starts, but at harvest time will require trimming from 6 to 12 inches off the butt to produce an acceptable handle.

Various spacing methods are employed, both to make straight rows and for spacing within the row. In plantations that are to be cross-mowed, careful placement of the seedlings is critical. Small plantations have been laid out by stretching string, but this is very time consuming and frustrating, particularly on windy days. A good method is to mark the plantation with a farm tractor and some implement capable of scratching the surface, a subsoiler or one shovel of a cultivator. For cross-checking, the plantation is marked in both directions, and a tree planted at each crossing.

Machine planting. Mechanical tree planters are available for loan at all Forestry Regional Offices of the Conservation Department on a first-come, first-served basis. These machines will fit any tractor equipped with a 3-point hitch. Often during the planting season, the waiting list and schedule is disrupted by foul weather, which often results in a delay. Several larger growers have bought or built their own machine, at costs from \$600 to \$1,500, thus waiting lists are avoided and seedlings may be planted on arrival.

If properly adjusted, these planters will penetrate deep enough to minimize improper root placement. Most problems occur where the soil is too rocky, too wet or too dry. Wet soils tend to ball up packing wheels, or to tear out wide furrows rather than the desired slit made when the soil is at proper moisture levels. Very dry soils will sometimes tear out in large chunks, thus making proper closure of the trench impossible.

In order to insure proper packing of the soil for each individual tree, and to insure that the seedling is standing straight in the ground, it is strongly advisable to have a worker follow the planter to make necessary corrections.

Care of seedlings. Many failures in plantation establishment can be attributed to planting seedlings that have already died, or at best are severely stressed from improper handling from the time they are received until they are in the ground. It should be obvious that root systems must be kept moist, both in storage and during the planting operation, yet failures continue to occur every year with regularity.

The absolute best in seedling care would be to lift from the nursery bed and plant the same day. This is rarely possible, however, unless a grower is within a short distance of the nursery or grows his own seedlings. Research is revealing that even with the best in handling and facilities, the percentage of seedling mortality increases with each day seedlings are out of the ground. Thus the importance of advance planning, having seedlings arrive when the planting is scheduled to start, cannot be overemphasized.

Even the best laid plans can go astray, however, and periods of bad weather often cause delays. Seedlings may be kept in their original shipment package for a week or more, provided the moisture supply is frequently checked, and that the bundles are not allowed to freeze or heat.

Root systems can receive additional protection, both during heeled-in storage and during the planting operation, by using a root dip of a starch compound made into a slurry. Sold under various trade names (examples: Aqua-gel and Terra Sorb), this material attracts water, and even benefits seedlings for several months after planting.

Cultural Practices

Would-be growers have some knowledge of planting and harvesting, but many fail to think about various cultural operations that turn failure into success. It is this phase that determines quality, and in the Christmas tree business, without quality is to have nothing.

Mowing. The most expensive operation in terms of equipment and labor is the mowing phase. All plantations must be mowed between rows at least once each year, and often as many as 4 or 5 times, depending on vegetation. Cleanly-mowed plantations are easier to tend, reduce cover harboring rodents, allow better air circulation thus reducing disease potential, reduce fire hazard and allow better lower branch development on trees.

The mowing operation can be greatly speeded by the use of herbicides around each individual tree or as a band down the row. Delayed mowing without herbicide use can be frustrating and time consuming, often requiring rows to be flagged in order to locate seedlings. Seedlings overtopped any appreciable length of time will lose their vigor, and even die from lack of sunlight and competition for soil moisture.

Herbicides. Many effective herbicides have been available for years. Better ones are being constantly developed, as well as different application methods.

Herbicides fall into two broad categories, and a few will fit both categories.

7. Pre-emergent herbicides are primarily applied before unwanted plants germinate from seed, and are taken up through the tiny root system as the seed germinates. Perhaps the best and most widely used for all Christmas tree species is Simazine. It is applied as a spray or as granules in March or early April, and will control most annual weeds and grasses. It has little effect on perennial weeds and established sod grasses, or on woody plants, but is often used in conjunction with other herbicides that will affect these.
8. Post-emergent herbicides are applied to existing vegetation, and may either be taken up through the roots or through the leaves. Many of this group are non-selective, and their use in trees requires shielding of the tree foliage. Others are safe to go over the top of trees, and it becomes simply a matter of following recommendations and label directions to know which ones to use, on what species of tree, at what rate and the correct time of the year.

One of the best chemicals for Scotch pine in Missouri is hexazinone (trade name Velpar). It is formulated in pellet, liquid and soluble powder form, with the latter two of most use for weed control. Applied at the rate of 2 lbs. active ingredient per acre (AIA) of treated area, it can be applied over newly planted seedlings or older trees alike, and will control grasses, most annual weeds and seriously damage broadleaf woody plants. It may also be used on Virginia and Austrian pines, but must never be applied to white pine at even low rates.

For most vegetation, Velpar will give season-long control, although excessive rainfall may lessen the effects and some invasion of annuals may emerge in late summer.

Glyphosate (Roundup) may be used in a rope wick applicator around individual trees, and may even be used to kill hardwood sprouts applied as a 2% foliage spray in late summer after the pines have hardened.

A must in the application of herbicides is using the proper rate, thus the need for adequate equipment and careful calibration before use. Separate procedures are included that deal with calibration of mechanical and backpack sprayers.

Shearing. Because it must be done in the summer (mid-June through mid-July), this is one of the most grueling jobs of the Christmas tree farmer, yet the most important. Shearing, or the shaping of trees, is the most determining factor in quality of marketed trees. Not only does this operation

have a direct bearing on shape, but also density and uniformity that makes a tree either poor, average or superb.

The basic idea is to “cut away everything that doesn’t look like a Christmas tree” (oversimplified). Determinate growth pines (those that develop one whorl of branches per year) tend to grow longer terminal leaders than can be allowed to maintain acceptable density. The leaders must be cut back during the time of year when new buds will be formed to produce whorls in succeeding years. Cutting also stimulates additional buds than would be formed naturally, thus adding to density.

Although mechanical shearers have been developed, both hand-held and completely mechanized, most Missouri Christmas trees are sheared by hand. Many growers are going to the shearing knife, a thin blade about 14" to 16" long that will hold an extremely sharp edge. Cutting is done in a downward slicing action, which gives a clean cut in a straight line. This, coupled with pruning to give proper leader length and occasional corrective work for problem trees, will assure a high percentage of trees in a plantation becoming saleable. It is not uncommon to recover better than 90% of the trees that survive initial establishment.

Shearing is difficult to learn from a textbook, because every tree is different, and many will need special attention. It is necessary to know something about how a tree grows and some of the basic physiology involved. A basic foundation to the reasons behind some of the shearing techniques is the tree’s ability to send up a terminal leader taller and straighter than other lateral branches around it. This is accomplished by the production of hormones in the terminal bud, with the topmost terminal bud generally producing the most, and buds of laterals producing decreasing amounts from top to bottom of the tree.

When a terminal becomes damaged, either physically in the case of being broken off by birds or by insect activity or disease, hormone production is taken over by usually more than one of the topmost laterals. Unless corrective work is done, multiple tops or serious crook will result. Many times, such damage can be corrected by tying two opposing laterals together, clipping one much shorter than the other, and making sure all other laterals in the same whorl are debudded. This sounds complicated, but the tying takes the most time, and the results are well worth the investment.

White, Austrian and red pines tend to be weaker bud-setters, and must be sheared earlier. There is some variation in seasons, but generally shearing should begin when new growth is about finished – in early June. Scotch pine should begin about mid-June, when the light green of the stem of new growth begins to take on a slight tan color. Shearing too early for Scotch pines will cause early bud set and resumption of growth, but this secondary growth seldom sets satisfactory buds for next year’s growth.

In the life of a plantation, shearing should start no later than the third year, and even a fast run-through in the second year will help. There is a marked tendency to over-shear in the early years, which delays the tree in reaching merchantable size. About all that’s needed is to cut back any abnormally long growth, including the terminal, and do any corrective work such as re-

establishing lost leaders or correcting multiple leaders. Shearing must be done every year thereafter, and each year will require more time as the trees increase in size.

Individual trees marked for sale in the final year need not be sheared as tightly as those to be held another season. A more natural looking tree is produced if the last shearing removes only excessive growth. This works particularly well in wholesale operations where a grower is sure of the trees that will be sold. In choose-and-cut operations, where a tree may or may not be chosen, all trees must be sheared as if they would be left, otherwise a loosely sheared tree will develop an uneven appearance with gaps in the top if left for the next season.

The decision of how to shear each individual tree will need to be altered constantly, because each tree has its own character and growth habits. Terminals should average 12" in length, and always cut at a 45% angle to encourage a leading bud to develop that will be next year's terminal. Trees with horizontal branching habits should have their terminals cut shorter, perhaps 8" to 10", but conversely, those with upswept branches may be cut to 15", even in some cases 18", and still result in a full tree devoid of any gaps. This of course will benefit the grower, because such trees will reach marketable size a year or two earlier, thus recovering investment cost sooner.

Lateral branches in the top whorl should be cut to 1/2 to 2/3 the length of the leader. Cutting shorter than this weakens bud set and resultant subsequent year's growth, and will produce "goose necks," a hole in the top of the tree that is very difficult to fill.

Butt pruning, or the removal of branches at the bottom to produce a handle, is a good practice. It aids in weed control, helps to control mouse damage and allows good air circulation that tends to reduce the potential for needle diseases. This is a practice that can be done any time of the year, and many growers do this during the winter months in slack work periods. Others contend that bottom branches can be utilized for wreaths and other products, and prefer to delay butt pruning until harvest time.

Protection

As with any crop, there are adversities in raising Christmas trees, some with devastating potential that can wipe out an entire plantation in a short time, while some tend to build up over time. Constant surveillance is one of the best ways to detect problems before they reach uncontrollable proportions.

Fire. Always a threat, and particularly during very dry seasons or during winter months. Perhaps the best preventive for fire is a good mowing job and keeping road systems in a green sod or gravel. Even closely-mowed plantations will burn in the right climatic conditions, and even though heat might not kill the trees, they would certainly be rendered unmarketable.

Livestock. There have been recorded instances of the beneficial uses of livestock grazing in controlled situations, but generally this is not a recommended practice. Trampling young trees and browse damage can completely ruin a plantation in a matter of a few days.

Wildlife. Girdling of trees of all sizes can be a problem if mouse populations are allowed to build, and if grass is allowed to accumulate around the base of trees. Again, mowing and the use of herbicides to kill vegetation right up to the trunk of trees is the best control. Close mowing allows better predation of mice by coyotes and birds of prey.

Deer and rabbits are particularly harmful to young seedlings, and inflict the most serious damage the first winter following establishment. Rabbits seldom eat the seedling, but will cut them off just out of pure orneriness. Rabbit damage can be easily recognized by the clean 45° angle cut and usually the top of the seedling will be lying on the ground. Deer on the other hand actually browse tops out of seedlings, sometimes leaving only the bottom 4 to 5 inches and the severed top will be a jagged break rather than an angled cut. Some damage by both can be tolerated but often excessive damage needs control.

Hunting pressure will help. Again, clean mowing will help on rabbits, which leaves them little cover to escape predators. The use of repellents might be in order in extreme cases. Since most damage occurs in late winter and early spring, perhaps one to two applications on young seedlings will be adequate. Several repellents are on the market, employing bone tar oil, hot sauce or other ingredients. One product, developed by Weyerhaeuser and called Deer-Away, looks promising.

Birds can damage larger trees by alighting on new growth in the spring before it hardens, breaking leaders and top laterals. The most damaging are blackbirds and grackles, although meadow larks can also do some damage. Various scare devices are effective the first few days (CO₂ cannons, distress call records), but they soon become accustomed to these. Actual elimination by the shotgun method will sometimes suffice. Others have developed traps to catch large numbers that have proven effective.

Insects and Diseases. A whole book could be written on this subject and several already have. For that reason, and for purposes of this paper, the whole subject will be treated in a general way. As of now, the main insect and disease problems affecting Missouri plantations are: Nantucket pine tip moth, sawflies, Pales weevil, aphids, red spider mites, pinewood nematode, brown spot and Naemaclycus needle blight and diplodia tip blight.

Control measure are sometimes necessary, either as spot control for the infected area only, or as a general application of a pesticide when conditions warrant. The indiscriminate use of pesticides can have an adverse effect on natural controls, thus making future treatments necessary on a regular basis. It is important to know what you are treating, what you are treating with, the recommended rate and method of application and correct timing.

Equipment Needs

This consideration is going to depend largely on the size operation planned, but will also be somewhat dependent on a grower's financial situation at the beginning. Since the early years of a business are without income, very often a new grower will either "make do" with what he already has, or acquire only the tools necessary to get by. This is a wise approach, since the first few years when a relatively small number of trees are involved require less equipment. It also

gives a grower the opportunity to see equipment in use by others, thus forming a better opinion of those items that will suit his needs best. Annual grower's meetings are very good examples of this, both in observing equipment being used and in looking over items displayed and demonstrated by exhibitors.

Some equipment can be borrowed, such as mechanical tree planters and planting bars. Some can be either made by the handyman grower or custom made at local welding shops. Used equipment is available at numerous locations, and is often a good way to get started without a large cash outlay.

Basic equipment will include something to plant with, a mower, a sprayer (garden type, knapsack or mechanical) for herbicides, pruning shears and a shearing knife. Additional equipment in later years might include a tractor, trailer, tree shaker, baler, bow saws, chain saws, elevators, self-propelled brush saws, pickup or larger sized truck and personalized tags.

Records

One of the weakest business practices of most growers is keeping accurate records, both financial and informational. The final price you get for your trees should reflect production costs, risks and a modest profit.

Without good records, production costs are difficult to come up with. IRS also likes to have some inkling of how much you owe them, and financial records on an annual basis are necessary for this.

Records of informational nature would include field number(s), when planted, what species (strain), number of seedlings, some idea of survival, subsequent replanting and the amount of time for each cultural operation (labor, both your own and hired, since they both are computed in the production costs of a tree, but IRS will only allow deducting that part hired), all materials used, equipment time, number of trees harvested and even disposal costs of those few that won't make it. In short, everything that related to the cost of production for the whole rotation should be recorded.

Depreciation schedules must be kept on all major equipment purchases, as well as maintenance and repair costs. Overhead expenses (fuel, electricity, insurance, interest paid on borrowed capital, etc.) are expensible items, and also must be figured into the final production cost of each tree sold.

The sale of Christmas trees are treated the same as timber for IRS purposes, i.e., depletion allowance may be claimed and the income treated as capital gains. Unless a grower has some talent in accounting, it is advisable to find a good CPA or other tax expert. This does not relieve the grower of keeping good records, but it does make the job of filling out tax returns less painful. A good tax expert will often save enough in avoided taxes to pay for his services.

Marketing

This is generally done in one of two ways in Missouri, either wholesale or retail by the choose-and-cut method. A few growers are doing some marketing both ways.

Wholesale. Wholesale is where the grower furnishes trees to a retail lot in town, either operated by an individual or by a church or civic group as a fund-raising function. Trees may be cut and delivered by the grower for a predetermined and agreed upon price, cut by the grower and sold F.O.B. his farm (with the retailer responsible for transportation) or sold as stumpage in the field. Usually the preferred method in rural areas, the wholesaler depends more on large volumes rather than higher prices per tree. The mark-up of trees from wholesaler to retailer is usually 100%, but often is higher, depending on what the market will stand at the retail level, and to some degree on the involvement of the wholesaler. For example, trees purchased in the field, cut and transported by the retailer will naturally command a lower price to the grower than those cut and delivered to the retailer's lot by the grower.

Retail by the grower. Occasionally a grower will open a retail lot in town to furnish a consumer outlet for his trees, but more often, and gaining in popularity is the choose-and-cut plantation. By necessity, operations of this kind must be located near large population centers, have good access, ample people-handling facilities and well-kept plantation, for the plantation is the showroom. Choose-and-cut trees commonly are priced at or slightly below the price of trees on a retail lot, which gives the grower a better per tree income. The trouble of cutting and transporting trees, as in wholesaling, is traded for handling people on an individual basis.

Choose-and-cut plantations often provide refreshments to customers, a heated building, comfort stations and several even offer hayrides and a Santa for the children. Many have other Christmas items for sale, such as wreaths, green boughs, ornaments, tree stands and food items.

Each grower will need to weigh his circumstances and should decide early on which marketing method best fits his desires.

Trade Associations

Missouri growers have three associations available to them, each of which has a place.

National Christmas Tree Association. Engages in promotion of natural trees through media, monitors national issues affecting the industry, publishes a quarterly journal and has a merchandiser to assist in sales.

Mid-America Christmas Trees. An association of essentially Scotch pine growers and more of an information dissemination group.

Missouri Christmas Tree Producers' Association. Currently has almost 200 members and has more than doubled in size in the last 5 years. Two meetings are held each year, January and July. The winter meeting involves speakers on various subjects of interest to the industry. Summer meetings are hosted by a member at his farm, which gives everyone a chance to view first hand the machinery used, methodology, and a chance to visit and exchange ideas with other growers. Membership includes a subscription to the quarterly magazine, "Christmas Trees."

Contact information for each of these associations can be found at www.realchristmastrees.org. Anyone at all serious about growing Christmas trees should at least consider membership in their state association, and perhaps all three associations as they progress into the business.

Future Outlook

There appears to be increasing alarm by established growers that the industry might soon be faced with an oversupply, based on surveys of recent plantings and the number of new growers starting in the business. The South has traditionally been a strong market for northern-grown trees. With widespread planting of Virginia pine, which can reach marketable size in as little as four years, this could seriously affect this market. The pessimistic prediction is that large growers, more efficient in production, might find Midwest (Missouri) markets as an alternative to the South, and might even undercut Missouri growers in price.

The key to this is quality. Growers who have quality trees will find markets, those who would rather settle for less quality as opposed to dedication in the work required to producing that quality, might find outlets drying up.

The industry has a challenge, not only to upgrade trees produced, but to promote the natural tree as less energy consuming than artificial trees, along with the other benefits that trees produce.

Calibration of Backpack Sprayer

(should be equipped with regulator)

9. Fill the sprayer with water and pressurize at the same pressure you will be spraying.
10. Hold the spray nozzle at carrying height and spray a width on the ground, then measure the spray width.
11. From the table below find the spray width which is closest to your spray width. To the right and on the same line will be the calibration distance.
12. Measure the calibration distance on the ground in the same type terrain as you will be spraying.
13. Walk the calibration distance at a rate you will be walking when applying the spray, and note the time. Do this twice to make sure of your time.
14. After the time is established from Item 5, spray from the nozzle(s) into a container graduated in ounces, or pour the collected spray into a container graduated in ounces.
15. The ounces collected will equal the spray rate in gallons per acre.

Calibration Table

Nozzle Spray Width		Calibration Distance	The number of ounces of water collected in the time to travel the calibration distance is equal to the number of gallons applied per acre.
6 ft	(6 ft)	57 ft	
5 ft 8 in	(5.7 ft)	60 ft	
5 ft 4 in	(5.3 ft)	64 ft	
5 ft	(5 ft)	68 ft	
4 ft 8 in	(4.7 ft)	72 ft	
4 ft 4 in	(4.3 ft)	79 ft	
4 ft	(4 ft)	85 ft	
3 ft 8 in	(3.7 ft)	93 ft	
3 ft 4 in	(3.3 ft)	102 ft	
3 ft	(3 ft)	113 ft	

Example:

The measured spray width was 5 feet.

The calibration distance (from the table) for a 5 ft band is 68 ft.

Walking the 68 ft required 23 seconds.

The nozzle sprayed 12 ounces in 23 seconds, therefore, the sprayer is applying 12 gallons per acre.

If a greater calibration distance is desired than shown in the table, double the calibration distance and then divide the ounces collected by 2. The collected ounces after being divided by 2 will equal the gallons per acre. The rationale will hold true for any multiple.

Procedure for Calibrating a Mechanical Sprayer

Measure, or pace off, a known distance in the field where the spraying is to be done. The longer the distance measured, the more accurate the calibration will be.

Fill the sprayer with plain water. At the starting line have the pump running but the boom valve closed. Open the boom valve as you cross the starting line.

Spray the measured distance, driving at a constant speed, noting the throttle setting. Close the boom valve as the finish line is crossed.

Measure the exact amount of water required to refill the spray tank.

To figure the exact amount of spray being applied per acre, use the following formula:

$$\frac{43,560 \times \text{gallons needed to refill the spray tank}}{\text{Distance sprayed (in feet)} \times \text{width of band (in feet)}} = \text{gallons per acre}$$

Example:

It takes 145 ounces (1.14 gallons) of water to refill the spray tank after spraying 660 feet, using a nozzle that covers a 3 foot band.

Therefore:

$$\frac{43,560 \times 1.14}{660 \times 3} = 25 \text{ gallons applied per acre.}$$

Consequently, mix the chemical concentrate with water so that the desired amount of chemical per acre will be contained in 25 gallons of spray mixture.